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Properties and Propositions: The Metaphysics of Higher-Order Logic, by Robert Trueman. Cambridge: Cambridge University Press, 2021. Pp. xi + 227.

1. Overview

Two analogous hierarchies play a prominent role in contemporary metaphysics. One is a logico-linguistic hierarchy of expressions: singular terms (henceforth simply 'terms'), predicates taking terms as arguments, predicates taking those previous predicates as arguments, and so on. Those expressions combine to form sentences and the hierarchy then further expands with predicates taking sentences as arguments (i.e. sentential operators), predicates taking those previous predicates as arguments, and so on. Those expressions also combine to form further sentences, and off we go again.

The other hierarchy is a metaphysical hierarchy of (mostly) non-linguistic entities: objects, properties of objects, properties of properties of objects, and so on. Those entities combine to form further entities variously called states of affairs, propositions, truth-conditions, and ways for the world to be; I call them propositions. Once supplied with propositions, the metaphysical hierarchy then further expands with properties of propositions, properties of properties of propositions, and so on, which combine to form further propositions, and... well, you get the picture.

One central theme from the resurgence of metaphysics in the late twentieth and early twenty-first centuries was that the metaphysical hierarchy is largely independent of the logico-linguistic hierarchy. The structure of reality is one thing, our vehicles for communicating about it are quite another.

Robert Trueman's *Properties and Propositions* offers a timely corrective to this aspect of contemporary metaphysics. Self-consciously inspired by Frege, Trueman argues from premises about the logico-linguistic hierarchy to conclusions about the metaphysical hierarchy. Indeed, Trueman argues for deep structural similarities between the two hierarchies. For example, only terms can refer to objects, only predicates taking terms as arguments can refer to properties of objects, and so on. Furthermore, only declarative sentences—henceforth simply 'sentences'—can refer to propositions, only sentential operators can refer to properties of propositions, and so on. These striking conclusions are all supposed to follow from a proper understanding of the various different semantic roles of terms, predicates, sentences, operators, and so forth. Those familiar with Frege's (1892) 'On concept and object' will see the similarity here.

Continuing the Fregean theme, Trueman's view is in fact even more radical than just suggested. Terms don't merely fail to refer to properties. Rather, it does not even make sense to say that a term refers to a property, or that a predicate refers to an object. More generally, Trueman argues that entities drawn from different locations in the metaphysical hierarchy are *incomparable*: nothing it makes sense to say about one also makes sense to say about the other. For example, if it makes sense to attribute a property to an object, then it does not make sense to attribute that property to anything other than an object; if it makes sense to attribute a property to a proposition, then it does not make sense to attribute that property to anything other than a proposition. Attempts to attribute properties more widely are strictly and in principle nonsense, in that there are no such propositions to be expressed. Trueman aims to derive these striking conclusions from premises about the semantic roles of expressions in the logico-linguistic hierarchy, and how those roles enable or prevent expressions from combining to form meaningful sentences.

An example to illustrate, drawing on (Jones, 2018) and Trueman's chapter 10. Tibbles the cat is spatially located. Since Tibbles is an object, no proposition attributes spatial location to any property or proposition: it does not make sense to say that properties and propositions are spatially located. The classic problem of whether and where properties and propositions are spatially located thereby dissolves.

Trueman's view leads naturally to higher-order metaphysics, i.e. the project of using higher-order quantifiers to generalise about properties and propositions (Williamson, 2013), (Dorr, 2016), (Skiba, 2021), (Fritz and Jones, 202xa). Because terms refer only to objects, Trueman argues that the familiar first-order quantifiers binding variables in term position range only over objects. He therefore uses primitive higher-order quantifiers binding variables in other positions to generalise about properties and propositions. For example, generalisations about properties of objects are expressed by quantifiers binding variables in the position of predicates that take terms as arguments; generalisations about propositions are expressed by binding variables in the position of sentences.

One distinctive feature of *Properties and Propositions* is Trueman's route into higher-order metaphysics. Others have been motivated by abductive considerations about the elegance, utility, and metaphysical attractiveness more generally of the view, as well as by the paradoxes that threaten first-order theories of properties (Williamson, 2013), (Fritz and Jones, 202xb), (Bacon, 202x). By contrast, Trueman aims to derive the view from semantic considerations about the meanings of terms, predicates, sentences, and other expressions. Irrespective of whether this ambitious project ultimately succeeds, there is much to be learned from having the strongest version of this non-abductive case for higher-order metaphysics laid out with such clarity and detail.

After developing his conception of the metaphysical hierarchy in chapters 1–9, Trueman applies the view to a range of thorny metaphysical problems in chapters 10–14. These problems include the problem of universals, the locations of properties, Bradley's regress, converse relations, the existence of facts, logically complex facts, the nature of truth, propositional content, and the relation between thought and reality. Although some of these topics have been previously treated within higher-order metaphysics—(Jones, 2018) discusses the locations of properties, and tropes vs. universals; (Jones, 2019) discusses propositions and the relation between thought and reality—this is the first systematic treatment of such a broad range of metaphysical questions from a higher-order perspective. Trueman shows that this offers significant benefits: chapters 10 through 14 are essential reading for anyone interested in the metaphysics of properties and propositions.

One notable virtue of *Properties and Propositions* is Trueman's explicit attention throughout to the historical development within the analytic tradition of the views he discusses. The views of Frege, Russell, Wittgenstein, Ramsey, Prior, Strawson, Dummett, Geach, Wiggins, McDowell, Hale, and Wright all make prominent appearances. Trueman's goal is not mere historical reconstruction, however, but distillation of earlier insights and debates into a contemporary theoretical setting.

I turn now to two more detailed critical points. One (§2.) concerns predicate abstraction and Trueman's claims about the consequences of higher-order metaphysics for various longstanding metaphysical disputes. The other (§3.) concerns Trueman's argument for higher-order metaphysics. Since the following comments are critical, let me first be clear that this is an excellent book, containing a rich supply of creative arguments presented in clear and lively prose with a minimum of technicality.

2. Predicate Abstraction

Predicate abstraction plays a prominent role in *Properties and Propositions.* I now argue that Trueman's notation for predicate abstraction hides a substantive metaphysical presupposition. I then outline two ways this affects his arguments about the metaphysical consequences of higher-order metaphysics.

Typical treatments of predicate abstraction use the variable-binder λ to form complex predicates with argument positions corresponding to the variables bound. For example, the complex predicate 'is F and G' is formalised by:

$$(\lambda x.Fx \wedge Gx)$$

Complex predicates are applied just like simple predicates, by writing their arguments after them. So $(\lambda x.Fx \wedge Gx)$ is applied to the argument a thus:

$$(\lambda x.Fx \wedge Gx)a$$

One natural principle governing λ-terms says that applying a complex predicate to some arguments is just the same as writing those arguments in place of the corresponding bound variables:

$$(\beta) \qquad (\lambda x_1, \ldots, x_n.\phi)a_1, \ldots, a_n = \phi[a_1/x_1, \ldots, a_n/x_n]$$

The x_is and a_is here may be of any syntactic types, provided each x_i and corresponding a_i have the same type. Note that the identity sign in (β) takes whole sentences as arguments; it could be pronounced 'for it to be that ... just is for it to be that ... ' (Dorr, 2016). The instance of (β) corresponding to our example is:

$$(\lambda x.Fx \wedge Gx)a = Fa \wedge Ga$$

Informally: for it to be that a is F and G just is for it to be that a is F and a is G.

Trueman adopts a different notation inspired by Frege. Complex predicates are formed by deleting constants from sentences. The resulting gaps are the argument positions of the predicate. Complex predicates are applied by writing their arguments into the gaps. To formalise our example 'is F and G', we begin with the sentence:

$$Fa \wedge Ga$$

and delete both occurrences of a to yield:

$$F \ldots \wedge G \ldots$$

with gaps marked by dots. This complex predicate is applied to the argument a thus:

$$Fa \wedge Ga$$

Note that this is just the sentence we began with. More generally, this Fregean notation cannot differentiate the two sides of (β). Instances of (β) become instances of the reflexivity of identity:

$$\phi = \phi$$

Relatedly, this notation sometimes cannot differentiate predications involving different complex predicates. For example, Fregean versions of the following different λ-predications are all written as $Fa \wedge Ga$:

$$(\lambda x.Fx \wedge Ga)a$$
$$(\lambda x.Fa \wedge Gx)a$$
$$(\lambda x, y.Fx \wedge Gy)a, a$$
$$(\lambda x.Fa \wedge Ga)a$$
$$(\lambda x.Fa \wedge Ga)b$$

The complex predicates here may not be coextensive, and do not all have the same number of argument positions or of arguments. Yet because these predications are not differentiated in Trueman's notation, one cannot sensibly raise within it the question of whether they express the same proposition.

Trueman's notation for predicate abstraction presupposes (β). Yet instances of (β) correspond to substantive metaphysical questions about identity. We should be able to question those instances without thereby presenting ourselves as questioning the reflexivity of identity, just as we can question whether Clark Kent is Superman without thereby presenting ourselves as questioning the reflexivity of identity. Even if every instance of (β) is in fact true, notational fiat cannot make it so.

This matters to some of Trueman's arguments. He argues that a higher-order conception of properties and propositions has certain consequences which differentiate it from a first-order conception. I will describe two points at which those consequences flow primarily from (β), not the higher-order conception alone. Moreover, analogous consequences are also available under a first-order conception that includes this counterpart of (β):

(β*) $$Ia_1, \ldots, a_n, [x_1, \ldots, x_n.\phi] = \phi[a_1/x_1, \ldots, a_n/x_n]$$

The x_is and a_is here all have the syntactic type of terms. The square brackets serve as a variable-binder analogous to λ, except they form complex terms rather than complex predicates: $[x.Fx \wedge Gx]$ is a term pronounceable as 'the property of being F and G'. Binding zero variables yields a term for a proposition: $[Fa]$ is a term pronounceable as 'the proposition that Fa'. I is an instantiation predicate. So $Ia, [x.Fx]$ says that a instantiates the property of being F.

Whereas (β) is consistent, (β*) is inconsistent due to Russell's paradox. However, Trueman explicitly sets aside the paradoxes as motivations for his view (pp.6–7). Setting the paradoxes aside, (β) and (β*) seem equally attractive. The project of developing consistent first-order theories including restrictions of (β*) is also currently ongoing; such theories could serve in my arguments below.

I turn now to Trueman's arguments. To clarify the role of (β) I use lambda instead of Trueman's notation.

First, Bradleyan regress (pp.129–137). Trueman argues that whereas first-order theories of properties naturally generate Bradleyan regress, higher-order theories do not. The first-order regress arises from the hypothesis that predication-facts $Ra_1, \ldots, a_n$ hold because of corresponding instantiation-facts $Ia_1, \ldots, a_n, [x_1, \ldots, x_n.Rx_1, \ldots, x_n]$. Regress arises because each instantiation-fact is also a predication-fact. Here are the first two stages:

Fa because $Ia, [x.Fx]$

$Ia, [x.Fx]$ because $Ia, [x.Fx], [y, z.Iy, z]$

By contrast, given a higher-order theory of properties, instantiation is expressed by complex predicates of the form $(\lambda X, y_1, \ldots, y_n.Xy_1, \ldots, y_n)$. The first two stages of the regress would then be:

Fa because $(\lambda X, y.Xy)F, a$

$(\lambda X, y.Xy)F, a$ because $(\lambda \mathsf{X}, Y, z.\mathsf{X}(Y, z))(\lambda X, y.Xy), F, a$

(The sans serif X has the syntactic type of predicates that take ordinary predicates as arguments.)

Replacing 'because' with an identity sign yields two instances of (β). This implicitly underwrites Trueman's claim that the sentences flanking 'because' are just notational variants, providing independent reason to reject this explanatory project. However, a higher-order theory of properties may lack this consequence without (β). Conversely, a first-order theory of properties may include (β*), providing independent reason to reject the corresponding first-order explanatory project and thereby blocking the regress. Susceptibility to Bradleyan regress turns not on first-order vs. higher-order, but rather on (β) and (β*).

Second, truth. Trueman argues that an attribution of truth to a proposition is a 'mere periphrasis' of a sentence expressing the proposition (pp.184–185). Although he suggests there is no propositional truth-predicate, that seems unwarranted because it can be identified with $(\lambda p.p)$. Trueman's 'mere periphrasis' claim thus presupposes the following instances of (β):

$$(\lambda p.p)\phi = \phi$$

Relatedly, Trueman argues that propositional truth is ungrounded (pp.203–207). We can understand his reasoning as assuming first that instances of the following about propositional truth:

$$(\lambda p.p)\phi \text{ because } \phi$$

are notational variants of instances of:

$$\phi \text{ because } \phi$$

He concludes from this that instances of the former contradict the irreflexivity of 'because'. However, this notational variance claim again presupposes the corresponding instances of (β). Moreover, there again seems no difference between higher-order and first-order conceptions of propositions here. To see why, note that the first-order counterpart of $(\lambda p.p)$ is I: for a proposition $[\phi]$ to be true just is for it to be instantiated, $I[\phi]$. We can now construct first-order counterparts of Trueman's arguments by invoking these instances of (β*):

$$I[\phi] = \phi$$

It follows that each instance of this schema:

$$I[\phi] \text{ because } \phi$$

about propositional truth contradicts the irreflexivity of 'because'. The key question thus again seems to concern (β) and (β*), not first-order vs. higher-order.

3. Substitution and Semantic Role

Trueman argues for his conception of the logico-linguistic and metaphysical hierarchies in chapters 1-9. I now raise a problem for that argument.

Trueman argues from premises about the semantic roles of expressions to conclusions about how those expressions can and can't meaningfully combine, and from there to conclusions about how entities can and can't combine to form propositions. Yet there are just too many ways of spelling out the possible meanings of predicates compatibly with their core semantic role. Although various further constraints will deliver Trueman's conclusions, I see no obvious reason to accept them. Progress requires a more abductive method, formulating various rival hypotheses and evaluating their overall theoretical costs and benefits.

Following Trueman, I focus primarily on the first three levels of the logico-linguistic hierarchy, although the discussion is intended to generalise. Those levels comprise terms (level 0), predicates taking terms as arguments (level 1), and predicates taking level 1 predicates as arguments (level 2). Predicates are always level 1 unless explicitly indicated otherwise. The names for all displayed principles are mine.

We can understand Trueman's argument as having three stages. First, an argument for:

Linguistic Exclusion No term and predicate are substitutable in any context $\phi(\ldots)$.

Second, an argument from Linguistic Exclusion to:

Different Reference Different relational predicates are needed to express reference for terms and for predicates.

Third, arguments from Linguistic Exclusion and Different Reference to:

Nonsense Co-Reference It does not make sense to say that terms and predicates co-refer (using the reference predicates appropriate to terms and predicates respectively).

Incomparability Term-referents and predicate-referents are incomparable: nothing that it makes sense to say about one also makes sense to say about the other.

The second and third stages of this argument convert linguistic facts about what can be substituted for what into metaphysical facts about what propositions there are. Given Linguistic Exclusion as input, this yields Incomparability as output. Just as Linguistic Exclusion says that terms and predicates cannot be substituted within sentences, Incomparability says that term-referents and predicate-referents cannot be substituted within propositions. Supplying the second stage with alternatives to Linguistic Exclusion as input will yield different views about what propositions there are as output. I focus on the first stage below, concerning the input.

A comment first on Trueman's notion of substitution, which he calls *sense-substitution* (chapter 1). What matters for present purposes is that it's intended to capture the idea of replacing the meaning of one expression in a sentence with the meaning of another expression, prescinding from merely syntactic obstacles to simply writing the replacing expression in place of the replaced one. For example, 'I' can be sense-substituted for 'Tibbles' in 'Tibbles is hungry' even though 'I is hungry' isn't well-formed.

Back to Linguistic Exclusion. It amounts to the conjunction of two claims. First, that no predicate can be substituted for (i.e. replace) any term. Second, that no term can be substituted for (i.e. replace) any predicate. I focus on Trueman's argument for the second claim, reserving e_i for expressions, t for terms, and P for predicates.

Trueman argues as follows (p.31). Consider a meaningful sentence $\phi(P)$ in which level 1 predicate P occurs. To substitute term t for P here, we first have to delete the occurrences of P to obtain the complex level 2 predicate $\phi(\ldots)$. Now t is substitutable for P in $\phi(P)$ only if the meaning of this level 2 predicate can take the meaning of a term as its argument. But the meanings of level 2 predicates require meanings of level 1 predicates as arguments. Moreover, no term has the meaning of any level 1 predicate: terms and level 1 predicates play different and incompatible semantic roles. So no term t is substitutable for any level 1 predicate P in any meaningful $\phi(P)$.

Trueman's focus on level 2 predicates here arises from his notation for predicate abstraction. The notation does not differentiate between applying the complex predicate $(\lambda X.\phi(X))$ to t, and the sentence resulting from replacing P throughout $\phi(P)$ with t. Without assuming (β), however, those sentences may have different meanings. Still, there remain two ways that P may occur in $\phi(P)$:

(1) As predicate, with a term t as argument: Pt.

(2) As argument to a level 2 predicate F: FP.

Trueman's argument above most directly concerns (2). Following him here, our question becomes: can a term t be substituted for a level 1 predicate P when P occurs as argument in a predication FP?

Trueman's argument concludes with a negative answer to this question. The semantic principles operative in that argument include:

Role Exclusion The roles of terms and predicates are incompatible: no (unambiguous) expression can play both kinds of role.

Role Coordination If F plays the semantic role of a level 2 predicate, then a predication Fe is meaningful iff e plays the semantic role of a level 1 predicate.

I focus on Role Coordination below, arguing that Linguistic Exclusion does not follow even assuming Role Exclusion.

Role Coordination is an instance of a more general semantic coordination principle:

Strict Role Coordination For every level i, if F plays the semantic role of a level i predicate, then a predication Fe is meaningful iff e plays the semantic role of a level $i-1$ expression.

'Strict' because this captures the key feature of what Florio and Jones (2021) call strict type theory: a predication is meaningful exactly when the level of the argument immediately precedes the level of the predicate.

This strict view is not mandatory. Trueman does not argue for it in *Properties and Propositions*. More flexible views are also possible. One example comes from cumulative type theory (Linnebo and Rayo, 2012). On this view, predicates can take arguments from all preceding levels, not just the immediately preceding level. This delivers an alternative coordination principle:

Cumulative Role Coordination For every level i, if F plays the semantic role of a level i predicate, then a predication Fe is meaningful iff, for some level $j < i$, e plays the semantic role of a level j expression.

The relevant instance corresponding to Role Coordination is:

Role Coordination* If F plays the semantic role of a level 2 predicate, then a predication Fe is meaningful iff e plays the semantic role of a level 1 predicate or a term.

Role Coordination* entails that when F plays the semantic role of a level 2 predicate, Ft is meaningful for any term t. Terms can then be substituted for level 1 predicates P whenever P occurs as argument to a level 2 predicate.

I now consider two reasons to endorse the strict coordination principles rather than the cumulative variants.

The first comes from Trueman's principle (3) (pp.65–67). Modified slightly to fit the present context, this says:

(3) If (e_1 and e_2 play the same semantic role and e is substitutable for e_1 in some meaningful $\phi(e_1)$), then e is substitutable for e_2 in any meaningful $\psi(e_2)$.

This fails given Cumulative Role Coordination. To see why, suppose there is a meaningful predication FP where P occurs as argument to level 2 predicate F, and a meaningful predication Pt where P occurs as predicate with term t as argument. Given Cumulative Role Coordination, P can play the same semantic role of a level 1 predicate in both FP and Pt, and t can also be substituted for P in FP (because Ft is meaningful). Yet contrary to (3), Cumulative Role Coordination also entails that t cannot be substituted for P in Pt (because tt is not meaningful). No such counterexamples arise given Strict Role Coordination.

In cumulative type theory, each context $\phi(\ldots)$ requires an expression whose semantic role comes from within a certain range. Provided the expression e replacing the dots comes from this range, the resulting $\phi(e)$ is meaningful. In our example, $F\dots$ requires any expression playing the semantic role of a level 1 or level 0 expression; $\dots t$ requires any expression playing any semantic role other than that of a term. Linguistic contexts $\phi(\dots)$ can thus be partitioned into kinds according to what range of semantic roles they require from expressions replacing the dots. This motivates a cumulative replacement for (3):

(3*) If (e_1 and e_2 play the same semantic role and e is substitutable for e_1 in some meaningful $\phi(e_1)$), then e is substitutable for e_2 in any meaningful $\psi(e_2)$ such that $\psi(\dots)$ has the same kind as $\phi(\dots)$.

Trueman claims that (3) is needed to ensure that universal substitutability is transitive, given his definition of substitution. Yet (3*) entails (3) when e_1 and e_2 are universally substitutable, and so has this consequence too.

Here's how Trueman argues for (3). Recall our earlier supposition of meaningful predications FP and Pt where t is substitutable for P in FP but not in Pt. He claims that P must make different contributions to the meanings of FP and Pt to explain why the meaning of P in one but not the other can be replaced by the meaning of t. However, a different explanation is available: a difference between the kind of context substituted into, rather than between what's substituted into them. The context $F\dots$ requires any meaning from one range, whereas $\dots t$ requires any meaning from a different range. Since the meaning of P belongs to both ranges, P is substitutable into both contexts. By contrast the meaning of t belongs only to the former range, and so t is substitutable only into the former context. This permits P to make a single semantic contribution to both FP and Pt. The pattern of substitution is explained instead by the different kinds of $F\dots$ and $\dots t$, compatibly with (3*).

The second reason to reject the cumulative coordination principles comes from (Button and Trueman, 2022, §5.3). Adapted to the present setting, the argument is as follows. First-order quantifiers are level 2 predicates. The cumulative coordination principles imply that they can be combined with terms to form meaningful quantifications such as $\exists$(Tibbles). But that's not meaningful. So the cumulative principles should be rejected in favour of the strict principles.

Although this argument shows that some level 2 predicates are not cumulative, it doesn't follow that no level 2 predicates are cumulative. Maybe Role Coordination governs some level 2 predicates, whereas Role Coordination* holds for others. Whether the strict or cumulative principles apply will then depend on the particular predicate-meaning at issue. And terms will be sometimes but not always substitutable for level 1 predicates occurring as arguments, depending on which level 2 predicate they occur as argument to.

Trueman says on page 30 that his argument for Linguistic Exclusion undermines cumulative type theory. We've just seen that this is false. Trueman's argument implicitly presupposes exactly the inflexible view of meaningful predication—codified by Strict Role Coordination—that cumulative type theory rejects in favour of the flexible view encoded by Cumulative Role Coordination.

Note finally the key issue here is not cumulativity but *flexibility*: can some predicates meaningfully (and univocally) take arguments from more than one level? Cumulativity is one implementation of flexibility. Others are possible. Expressions within a level might differ over which other levels they can take arguments from. Or they might take only some and not other expressions from a given level as arguments. There might even be such variety that ordering into levels is not useful or possible (Schindler, 2019). Reflection on the semantic roles of terms and predicates alone cannot settle this issue. There are just too many coherent options. Progress requires a more abductive method, explicitly formulating some options and then evaluating how theoretically fruitful they turn out to be. It is presently an open question whether this method will favour strict typing or cumulative typing or something else entirely.*

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